UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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SQUIRE, SANDERS & DEMPSEY L.L.P.
8000 TOWERS CRESCENT DRIVE
14TH FLOOR
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EXAMINER
KIM, KEVIN

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/689,850	HOTTINEN, ARI
	Examiner	Art Unit	
	Kevin Y. Kim	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 June 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-19,21-34 and 36-51* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-19,21-34 and 36-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☐ Information Disclosure Statement(s) (PTO/SB/08)
　　Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
　　Paper No(s)/Mail Date. _____ .
5)☐ Notice of Informal Patent Application
6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2.   Claims 1-4,6-19,21-34,36-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ketchum et al (US 2003/0048856, previously cited) in view of Kuchi (US 2002/0126648 previously cited).

Claim 1:

As shown in figures 3 and 4, Ketchum discloses a method of controlling communication resources of a telecommunications system, the method including: determining a performance measure characterizing performance of a communication channel (channel state information, page 2, paragraph [0026]) between a first transceiver and a second transceiver, the communication channel including modulation (see block 322a and 354a in figure 3), wherein modulation symbols are distributed using at least two radiation patterns (see different paths with different antennas (i.e. 324a, 324t in figures 3 and 4)), the performance measure being sensitive to the modulation (page 15, paragraph [0171]); and controlling the communication resources based on the performance measure (see block 334 in figure 3, the controller is based on channel state information; page 15, paragraphs [0172] and [0173]).   Ketchum does not specifically describe that the communication channel may use non-orthogonal modulation matrix. Kuchi teaches that a communication channel using a non-orthogonal modulation matrix in order to increase

the symbol rate in the same field endeavor of multiple input multiple output

communication system. See paragraphs [0013] and [0014].

Thus, it would have been obvious to one skilled in the art at the time the invention

was made to use a non-orthogonal modulation matrix modulating the MIMO

communication channel of Ketchum for the purpose of increasing the symbol rate as

taught by Kuchi.

Claims 16 and 46:

As shown in figures 3 and 4, Ketchum discloses an arrangement for controlling

communication resources of a telecommunications system, the arrangement including:

means for determining a performance measure characterizing performance of a

communication channel (channel state information, page 2, paragraph [0026]) between a

first transceiver and a second transceiver, the communication channel including

modulation (see block 322a and 354a in figure 3), wherein modulation symbols are

distributed using at least two radiation patterns (see different paths with different

antennas (i.e. 324a, 324t in figures 3 and 4)), the performance measure being sensitive to

the modulation (page 15, paragraph [0171]); and means for controlling the

communication resources based on the performance measure (see block 334 in figure 3,

the controller is based on channel state information; page 15, paragraphs [0172] and

[0173]). Ketchum does not specifically describe that the communication channel may use

non-orthogonal modulation matrix. Kuchi teaches that a communication channel using a

non-orthogonal modulation matrix in order to increase the symbol rate in the same field

endeavor of multiple input multiple output communication system. See paragraphs [0013] and [0014].

Thus, it would have been obvious to one skilled in the art at the time the invention was made to use a non-orthogonal modulation matrix modulating the MIMO communication channel of Ketchum for the purpose of increasing the symbol rate as taught by Kuchi.

Claims 31,50 and 51:

As shown in figures 3 and 4, Ketchum discloses a controller of a telecommunications system, the controller including:
a performance measure estimator for determining a performance measure that characterizes performance of a communication channel (channel state information, page 2, paragraph [0026]) between a first transceiver and a second transceiver, the communication channel including: modulation (see block 322a and 354a in figure 3), wherein modulation symbols are distributed using at least two radiation patterns (see different paths with different antennas (i.e. 324a, 324t in figures 3 and 4)), and wherein the performance measure is sensitive to the modulation (page 15, paragraph [0171]); and a control unit connected to the performance measurement unit, the control unit for controlling the communication resources based on the performance measure (see block 334 in figure 3, the controller is based on channel state information; page 15, paragraphs [0172] and [0173]). Ketchum does not specifically describe that the communication

channel may use non-orthogonal modulation matrix. Kuchi teaches that a

communication channel using a non-orthogonal modulation matrix in order to increase

the symbol rate in the same field endeavor of multiple input multiple output

communication system. See paragraphs [0013] and [0014].

Thus, it would have been obvious to one skilled in the art at the time the invention

was made to use a non-orthogonal modulation matrix modulating the MIMO

communication channel of Ketchum for the purpose of increasing the symbol rate as

taught by Kuchi.

Claims 2, 17, 32:

Ketchum further discloses determining a plurality of performance measures for a

plurality of communication channels between the first transceiver and the second

transceiver (page 2, paragraph [0026]); and controlling the communication resources

based on the performance measures (see block 334 in figure 3, the controller is based on

channel state information; page 15, paragraphs [0172] and [0173].

Claims 4, 19, 34:

Ketchum further discloses including determining the performance measure by using a

channel model which characterizes the communication channel between the first

transceiver and the second transceiver (page 2, paragraph [0026]).

Claims 6, 21, 36 :

Ketchum further teaches the modulation matrix includes at least one symbol which is transmitted Using at least two antenna resources within at least two symbol time intervals (see figures 3 and 4, page 12, paragraph [0136]).

Claims 7, 22, 37:

Ketchum further discloses the modulation matrix includes at least one element in a group including: one row for forming a vector modulation, a plurality of rows for forming matrix modulation, a symbol rate greater than one, a row having a dimension greater than that of a channel matrix, a column having a dimension greater than that of the channel matrix, effect of spreading, effect of carrier, effect of waveform, and effect of channelization codes (page 9, paragraph [0107]).

Claims 8, 23, 38:

Ketchum further discloses including determining the performance measure using at least one element in a group including: channel information on a radio channel associated with the communication channel, antenna weights associated with the communication channel, and modulation information on the communication channel (channel state information, page 2, paragraph [0026]).

Claims 9, 24, 39:

Ketchum further discloses the performance measure comprises at least one element selected from a group including: frame-error rate, bit-error rate, signal-to-noise ratio, signal-to-interference ratio (page 2, paragraph [0025]).

Claims 10, 25, 40:

Ketchum further discloses comprising selecting a transmission method based on the performance measure (page 15, paragraph [0173]).

Claims 11, 26, 41:

Ketchum further discloses controlling the communication resources is based on comparison between a target value and the performance measure (page 15, paragraph [0173]).

Claims 12, 27, 42:

Ketchum further includes adapting the communication resources to instantaneous requirements based on the performance measure (page 3, paragraph [0028]).

Claims 13, 28, 43:

Ketchum further teaches the communication channel further includes at least one element in a group including: interleaving, spreading, carrier waveform, sub-carrier waveform, channel encoding, matrix modulation, vector modulation, MIMO modulation, space-time coding, space-frequency coding, space-code coding, beam forming, multi-

beam forming, radio channel, channel decoding, detection, equalizing, RAKE reception, and filtering of a received signal (see figures 4A and 4B).

Claims 14, 29, 44:

Ketchum further teaches the communication resources include a transmit communication resource selected from a group including: a temporal transmit communication resource, a spectral transmit communication resource, an encoding resource, a spatial transmit communication resource, and transmit power (see encoding resource 412 in figures 4A and 4B).

Claims 15, 30, 45:

Ketchum further teaches the communication resources include receive communication resources (see figure 3).

Claims 47-49.

See paragraph [0173] in particular for using a receive filter matrix which depends on a non-orthogonal matrix via the extended channel mode.

3.   Claims 3,18, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ketchum et al. (US 2003/0048856) in view of Kuchi (US 2002/0126648) as applied to claims 1,16 and 31 above, and further in view of Cheng et al. (US 6,411,817 cited previously).

Ketchum discloses all of the subject matters in claims 1, 16, and 31 above except for determining a second performance measure for a second communication channel between the

first transceiver and a third transceiver; and controlling the communication resources based on
the determined performance measures.

Cheng et al. teach measuring a second communication channel between first transceiver
and a third transceiver; and controlling the communication resources based on the determined
performance measures (figure 1). It is desirable to include measuring a second communication
channel between the first transceiver and a third transceiver in order to reduce interference and
increase wireless system capacity.   Therefore, it would have been obvious to one of ordinary
skill in the art at the time the invention was made to include measuring a second communication
channel between the first transceiver and a third transceiver as taught by Cheng into the system
as taught by Ketchum so as to reduce interference and increase wireless system capacity.

Response to Arguments

4.   Applicant's arguments filed June 17, 2008 have been fully considered but they are not
persuasive.

To summarize the rejection of the claims in the previous Office action, Ketchum
discloses a method of determining a performance measure of a channel comprising a modulation
and Kuichi teaches a communication channel comprising non-orthogonal matrix. It was
proposed that the teachings of these two prior art references would have been combined to arrive
at the claimed invention.   In that context, the applicant's understanding that the examiner
alleged that Ketchum discloses a communication channel comprising non-orthogonal
modulation" is not accurate.

Next, applicant argues that the channel state information used by Ketchum does not indicate any performance measure, in particular, sensitive to the modulation. However, Ketchum at paragraph [0026] teaches that the channel state information is used to "process (e.g., encode, modulate, and pre-weight) data such that the transmitted information bit rate for each channel matches the transmission capacity of the channel." Ketchum further teaches that the CSI may include the SNR of the channel. SNR is a commonly used performance measure of a channel. Applicant also alleges that Ketchum does not disclose that the modulation affects the values of the CSI. However, since the CSI is to used to modulate, encode and pre-weight data, as quoted above, there is a clearly interdependence between the modulation and the CSI, thereby indicating that the CSI is sensitive to the modulation, contrary to the applicant's argument.

In sum, applicant failed to patently distinguish the channel state information used in the cited prior art reference and a performance measure recited in the claims.

Conclusion

5.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Kevin Y. Kim whose telephone number is 571-272-3039. The

examiner can normally be reached on 8AM --5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin Y Kim/
Primary Examiner, Art Unit 2611